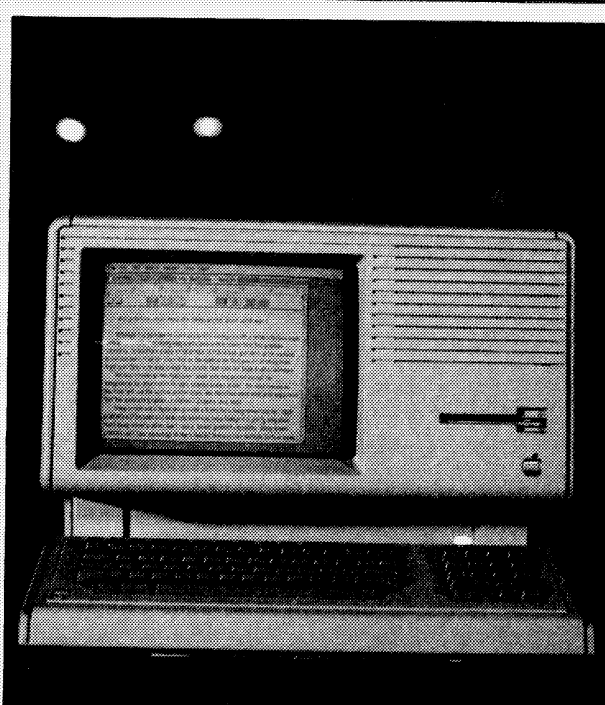
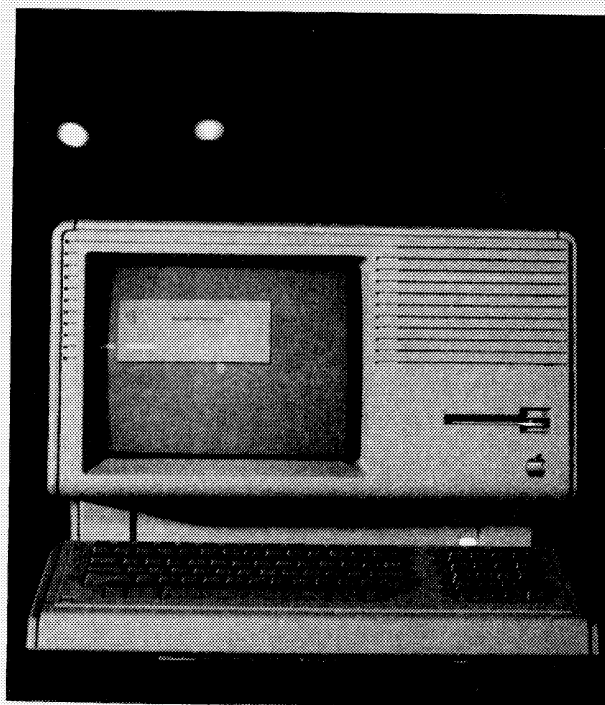


Apple Lisa Computer Technical Information



Apple Lisa Computer: MacWorks Development History (St. Mac • May 1984)

🍏 Apple Lisa Computer
Technical Information



Lisa Works Double Time

By Doug Pollack

Now that a lot of the fanfare accompanying Apple's introduction of the Macintosh has begun to die down a little, people are beginning to realize that the Mac is more than an appealing, innovative, and well-thought-out machine. It's also a component of a family of thirty-two-bit MC68000-based Apple products known collectively as the Apple 32 SuperMicros.

Included in this product line are the Macintosh, the Lisa 2, the Lisa 2/5, and the Lisa 2/10. The element that ties this family together, however, is MacWorks. MacWorks is the vehicle for upward compatibility of software across these products—something that's sorely needed to lend credibility to a consistent and coherent product line and to give it a fighting chance at solving real problems in a variety of business environments.

So What's MacWorks?

Apple's MacWorks manual describes MacWorks as the "Macintosh Environment for the Lisa System." What this means is that you can take the Apple 3 1/2-inch MacWorks disk, load it into any of the three Lisa 2 systems, and then use the majority of Macintosh software off the shelf, with no changes necessary.

As Lisa product manager Randy Battat puts it, "MacWorks lets you effectively turn your Lisa into a big Macintosh. You can use most or all of the same software but get the advantages of a bigger screen, bigger memory, and options to expand in the future, both in hardware and in software."

Doug Pollack is a member of Apple's newly created Apple 32 division and formerly the hardware product marketing manager for Lisa.

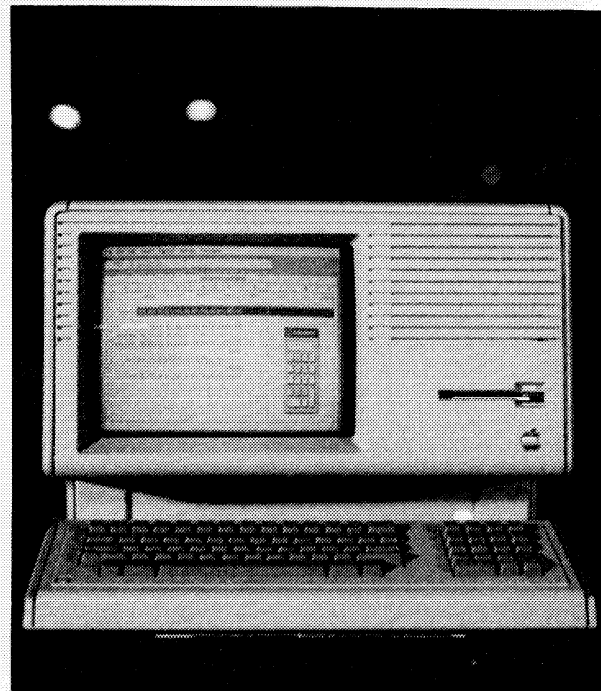
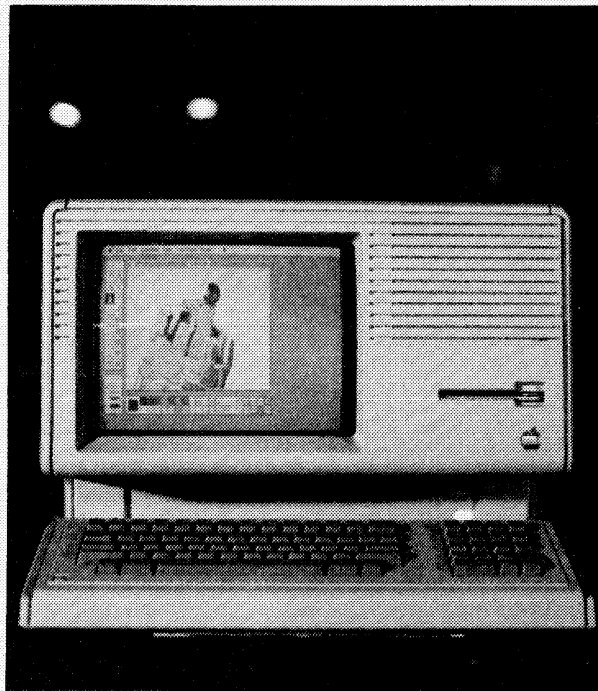
A Lisa with MacWorks allows you to take advantage of the Macintosh software explosion, yet provides you with the flexibility of Lisa's own integrated application environment.

Why did Apple decide to provide Lisa owners with the ability to run Macintosh software on Lisa? Well, with Macintosh, Apple hopes to re-create the scenario that occurred with the Apple II. The success of the Apple II can be credited in large measure to the totally open architecture of the machine, good dissemination of technical information for software and hardware developers, and a strong retail acceptance of the product through technological leadership and innovation. This combination resulted in the Apple II being a high-volume machine with a long life cycle and tons of software support. Understandably, Apple would like to see Macintosh walk down the same path.

MacWorks is the glue that binds together Apple's thirty-two-bit family of products. It provides the software compatibility that's needed for a viable product line and makes the Lisa 2 machines even better and more flexible than the original Lisa.

A Little Background

MacWorks was the brainchild of one of the many talented software engineers who inhabit the cubicle halls of Apple Computer. A large contingent of individuals at Apple back in the summer of 1983, including top management, believed that compatibility between Apple's MC68000-based products was critical. The technical issues involved in achieving such compatibility were complex—even overwhelming at times—and a consensus decision on the right way to go about it was not easy to arrive at. Jeff Parrish, at that time a member of the Lisa division's software group, felt he could create a workable solution



MacWorks Gives Lisa the Soul of a Mac

through a Macintosh environment that would run on the Lisa. Parrish took his proposal to Wayne Rosing, who was at that time the general manager of the Lisa division. Rosing gave him a quiet but distinct charter to begin working at his idea.

Parrish spent the next couple of months talking to and working with both the Macintosh software group and a number of his cronies in the Lisa software lab. The outcome of these interactions was a crude but effective demonstration that Lisa could and would run Macintosh software. At this time (September of last year), Parrish was able to show a bouncing balls application that was created during Macintosh development running on the Lisa.

Rosing was so pleased with this giant step forward that he asked Parrish to bring his demonstration to the next Apple board of directors meeting, where he was given an enthusiastic go-ahead to finish his work—and fast—on what was then called Mac-a-Like.

Concurrently, a group of hardware types were working a bit of their own magic to integrate a 3 1/2-inch disk drive and an optional ten-megabyte hard disk into the Lisa. This would provide the physical means for compatibility with Macintosh disks. The Lisa 2 products (then code-named *Pepsi* after the new management influence of John Sculley that was guiding Apple's direction) and the key MacWorks software were turned around in record time.

What Parrish and a small group of others had to deal with in the creation of MacWorks was how to make a Lisa look like a Macintosh to any random piece of Macintosh software designed by independent software developers. While this is clearly a great simplification, there were a number of pieces to be fitted together:

First, Parrish needed to take the contents of the copyrighted Macintosh ROM, containing the heart and soul of Macintosh, and have

MacWorks load them into a segment of Lisa's RAM memory. Then he had to make the Macintosh Finder—which comes with all Macintosh applications—believe that it was where it was supposed to be.

Next, Parrish had to implement the "ROM patches" that were being made to reflect last-minute changes to the Macintosh ROM code. These needed to be made taking into account the specific hardware environment of the Lisa, as well as the Macintosh Finder, which was still undergoing last-minute changes by the Macintosh software team.

And third, the hardware-specific low-level software (serial drivers, for example) had to be written to provide the appropriate I/O and the like for Macintosh programs when talking to the Lisa hardware.

Once all of this had been done, the environment had to be tested with as much final and prototype Macintosh software as could be found. The result was a set of guidelines that were provided to Macintosh software developers. These guidelines outlined the basic do's and don'ts of writing software that would not only work on all of the Apple 32 SuperMicros but would do the right thing with windows. Basically, developers were asked not to try to circumvent the appropriate ways of interfacing with the Macintosh Toolbox, and this meant that they shouldn't assume any hardware specifics for their software.

As you might expect, some bugs and inconsistencies came to light during this time. But the result is that a lot of the software for the Macintosh will be even better and more bug-free than it would have been, because developers have taken the time to look at it on Lisa and make sure that everything is working properly.

Using MacWorks

There are two ways to get MacWorks. First, everyone purchasing a Lisa 2 system (the entry-level Lisa product that retails for \$3,495)

will receive not only MacWorks but also *MacWrite* and *MacPaint* bundled with the machine.

For those who buy either the Lisa 2/5 or the Lisa 2/10, MacWorks (with *MacWrite* and *MacPaint*) is available separately for \$195. Apple made this an option for the 2/5 and 2/10 so that consumers could purchase the appropriate environments for their use instead of having to spend a lot of extra money for operating system software. (Lisa provides users with a number of choices. They can use Macintosh software, the Lisa Office System software—which requires a hard disk and a megabyte of memory—or the Unix operating system. Both the Xenix and UniPlus+ operating systems are available on Lisa from Santa Cruz Operation and UniPress respectively.)

MacWorks is available through all of Apple's retail dealers carrying Lisa and Macintosh, as well as through the Apple National Account Sales Representatives to qualified accounts. Apple expects MacWorks to be available through its distribution channels by mid-April.

MacWorks comes with a user manual that looks and reads a lot like the Macintosh manual except that most of the hardware references are eliminated. To use MacWorks, all you do is put the 3 1/2-inch disk into Lisa's drive, turn Lisa on, and tell it to boot from this drive (by hitting the Apple key and the 2 key simultaneously as soon as you hear the first audible click).

After loading MacWorks, Lisa ejects the disk and you see on the screen just what you would see if you had powered up a Macintosh without a disk in the disk drive, namely a disk icon with a flashing question mark. At this point, your Lisa is a Macintosh for all intents and purposes. You can insert your application and get to work.

Because Lisa has two serial ports, just like a Macintosh (in fact, both are driven by the same Zilog SCC chip, giving you RS-232/RS-422 compatibility), you can use one port for the Imagewriter printer and the other for a modem (or a remote computer connection) just as you can with Macintosh. The printing and communications will work just fine; the hardware differences are transparent to the user. The only difference is that Lisa requires a twenty-five-pin connector

and Macintosh needs a nine-pin connector, so you have to use a different cable—that's it.

The MacWorks Difference

Is Lisa 2 with MacWorks just like a Macintosh? The major question that most people have when looking at Lisa with MacWorks is, will everything work *exactly* the same on Lisa as on Macintosh? And the answer is that, while most software will function the same on Lisa as on Mac, there are several differences—some good and others of possible concern—that a prospective buyer should know about.

First, the aspect ratio on the Macintosh display (the ratio of horizontal pixels per inch to those displayed vertically) is not the same on Mac as on Lisa. Macintosh has an even number of dots in both directions, whereas Lisa has more dots across per inch than down. What this means is that Macintosh software used on Lisa makes both text and graphics look taller than they appear when displayed on Macintosh.

When you're dealing with most business applications, such as word processors, spreadsheets, and database managers, however, this does not cause any inconvenience whatsoever because of the nature of the way you work with and view these applications. Where you do notice the distortion, and where it can affect the quality of your work, is with certain graphics applications, such as *MacPaint*. The dimensions of objects on the screen will be stretched vertically compared to how they will look when printed. This results in circles that look like ellipses and squares that look like rectangles.

However, in a program like *MacDraw*, in which you can use rulers on the screen to measure objects, you'll get on paper what the rulers tell you on the screen. So if you draw a circle using *MacPaint*, say, and you make sure it's a circle by using the shift key, even though it looks like an ellipse on Lisa, it will print as if it were created on Macintosh as a circle.

If you're interested in doing freeform graphics, where the "what you see is what you get" fidelity is particularly important, *MacPaint* on Macintosh is the way to go. But for more structured graphics, such as those created with Microsoft's *Chart*, the Lisa 2 provides some real pluses. The larger screen allows you to see more of a larger graph or to display the graph and data series side by side prior to printing.

The next difference has to do with sound. Macintosh has some very special sound capability in hardware that produces full four-voice sound and gives Mac the capability to reproduce speech. Lisa does not generate sound in anywhere near the same way. Tones on Macintosh come out as beeps on Lisa. So if sound plays a big part in the selection of your computer, Macintosh is clearly the only way to go.

The last major difference has to do with the external disk drive for Macintosh. The Lisa 2 doesn't at this point support this drive as an add-on. This situation has resulted because there's a distinct price advantage to buying the Lisa with a hard disk. The Lisa 2/5, at \$4,495, costs only \$1,000 more than the Lisa 2 and comes with five megabytes of hard disk storage in the Apple ProFile. The external 3 1/2-inch disk drive for Macintosh costs \$495, and an interface card for Lisa 2 would have to cost in the \$300 range. It's Apple's feeling that customers who otherwise would have to spend \$795 to use this external 3 1/2-inch disk drive on Lisa would rather spend the additional \$205 and have a five-megabyte hard disk. So while the first release of MacWorks cannot use this hard disk, Apple engineers are working to add this capability to the next release.

The MacWorks Advantage

While Lisa will not do everything just the same as Macintosh, MacWorks on Lisa 2 does provide some tangible benefits to the Lisa user. Whereas Macintosh is a 192K system, with 128K RAM and 64K ROM, Lisa comes standard with 512K RAM. This means that you have approximately an extra 320K of memory to play with. For applications where all of the data needs to be in memory to run (such as *MacWrite*), this allows you to have much larger documents. Whereas *MacWrite* on Macintosh gives you about eight to ten typed pages for a document, a Lisa 2 with *MacWrite* gives you approximately eighty



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pages to work with.

This also translates to a 50 to 60 percent larger model in *Multiplan*. (This difference would be even larger if *Multiplan* were not limited to 64K of memory for more data, independent of how much memory you have.) And many other Macintosh applications will be able to use this extra 320K of memory for more expansive documents, models, databases, and the like.

The memory advantage also gives you some less tangible but equally important benefits. While Lisa's processor does use a five-megahertz clock rate compared with Macintosh's eight-megahertz rate, many applications may actually run faster on Lisa. Because more of the application can often be stored in memory on a Lisa at any one time using MacWorks, it does not require as frequent disk access to swap in pieces of the application as they are needed. So, with certain applications that tend to be larger and more complex, you can get your work done even faster on Lisa.

And, because the Lisa screen is bigger than the Mac screen (twelve inches diagonal versus nine inches diagonal), you can see more of just about any document at once, giving you a larger window into your Macintosh world. This is great for the serious number cruncher and others who appreciate the convenience of seeing more of what they are working on.

Third-Party Products with MacWorks

Getting back to what seems to be the question most often asked by those considering the purchase of a Lisa 2, will all third-party hardware and software products designed for the Macintosh work on a Lisa 2 with MacWorks? The answer, per Randy Battat, is "Yes, if they do it right."

Doing things right allows developers to take advantage of additional sales of their Macintosh products to users of the Lisa 2 line, which is being aggressively promoted by Apple. And with the strong response from dealers to the new Lisa 2 products, everything seems to point toward compatibility for the majority of software and hardware developed by third parties.

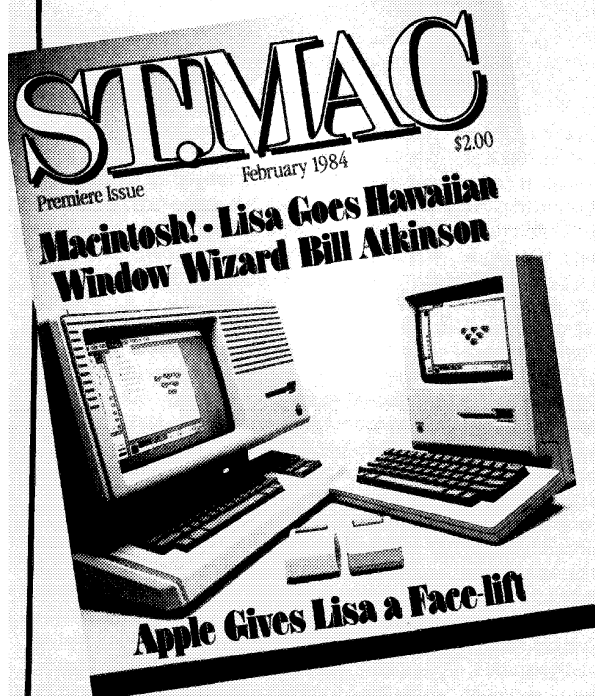
For example, the people at Apple have tested a number of prerelease versions of both their own and independent software developers' products for Macintosh running under MacWorks on Lisa. These products include Macintosh Pascal, Microsoft Basic, *MacProject*, Microsoft's *Chart* and *Multiplan*, *MacDraw*, and *MacTerminal*, to name a few. In addition, all members of the Macintosh Development Team receive a copy of MacWorks and any required documentation at the same time that they get their Lisa 2 upgrade kits for their development machines.

What's Next?

With MacWorks laying the foundation for compatibility between Macintosh and Lisa, the obvious question is, what can we expect next from the company that brought us Lisa Technology? Apple expects to enhance MacWorks to support both the ProFile on the Lisa 2/5 and the internal ten-megabyte hard disk with the Lisa 2/10. This should offer a rich hard disk environment for Macintosh software because it would allow the use of Lisa's direct parallel interface, enhancing the speed of transferring information.

When you look past the support of Lisa's hard disk, things get a bit more fuzzy. Full compatibility between Macintosh applications and Lisa Office System applications would seem a desirable but unlikely goal; Apple has not stated its specific intentions for future MacWorks enhancements. The company may try, at least, to provide data compatibility between some of its own applications on Lisa and Macintosh, such as between *LisaDraw* and *MacDraw* applications. For now, though, all of this is just blue sky.

One thing seems relatively certain, however. The advantages that MacWorks provides to business professionals—especially those who don't require extensive freeform graphics and high-fidelity sound—clearly outweigh any disadvantages associated with MacWorks on Lisa 2. And it does provide a real extension of Macintosh capabilities when used with the mainstay business applications—word processing, spreadsheet analysis, information management, business graphics, and communications—that are so important to most of us. 



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